Teacher Resource 4.1

Presentation Notes:   
Electromagnetic and Radio Frequency Interference

Before you show this presentation, use the text accompanying each slide to develop presentation notes. Writing the notes yourself enables you to approach the subject matter in a way that is comfortable to you and engaging for your students. Make this presentation as interactive as possible by stopping frequently to ask questions and encourage class discussion.

|  |  |
| --- | --- |
| C:\Users\Mika\Documents\My Documents\Pearson\2013\July\4\Networking_Lesson4_Presentation_ROOT_070413\Slide1.JPG  This presentation explains how electromagnetic interference (EMI), radio frequency interference (RFI), and cable length affect the signal quality of network cables. | Presentation notes |
| C:\Users\Mika\Documents\My Documents\Pearson\2013\July\4\Networking_Lesson4_Presentation_ROOT_070413\Slide2.JPG  Essentially all electric signals are electromagnetic pulses that travel along a wire. These signals have magnetic fields, causing adjacent signals or metal to be affected.  This phenomenon is what causes a nail to be pulled to a magnet, or two magnets to be pulled together, or two magnets to repel each other.  The distorted signals could cause a loss of data. The data would then have to be re-sent across the network, causing the network to appear slow. | Presentation notes |
| C:\Users\Mika\Documents\My Documents\Pearson\2013\July\4\Networking_Lesson4_Presentation_ROOT_070413\Slide3.JPG  There are two types of interference that can degrade the signal your computer or computer monitor receives:   * EMI — Electromagnetic interference is produced by electromagnetic waves from electromagnetic devices, including:   + Cell phones   + Cordless phones and pagers   + High-speed digital circuits   + Electric space heaters   + Other motorized devices * RFI — Radio frequency interference is an unwanted radio signal that prevents clear reception. It is typically caused by:   + Garage door openers   + Remote-control devices   + AM and FM radios and antennas   + Other radio transmitters | Presentation notes |
| C:\Users\Mika\Documents\My Documents\Pearson\2013\July\4\Networking_Lesson4_Presentation_ROOT_070413\Slide4.JPG  Different cable lengths have different effects on the quality of the signal that travels from the cable modem or DSL router to your computer.  When an electric current travels through a cable, not all of it reaches the receiving device, which in this case is your computer. Instead the current is reflected back to its source, disturbing the quality of the signal. This reflected flow of the current is known as *impedance*.  To keep the reflected current to acceptable levels, it is sometimes necessary to specify a minimum length of cable that separates two computer devices, such as the PC and the router. The minimum length for a CAT5e cable is about 8 feet (2.5 meters).  The maximum length that a UTP cable can be and still be effective is 328 feet (100 meters), the size of a football field. If you use a CAT5e cable longer than 328 feet, there will simply be no signal.  Network cable also has a specified bend radius, which means that you can only bend the cable so far before you start to damage the cable and therefore the signal. A typical minimum bend radius for a CAT5e cable is four to eight times the outside diameter of the cable, depending on the manufacturer. | Presentation notes |
| C:\Users\Mika\Documents\My Documents\Pearson\2013\July\4\Networking_Lesson4_Presentation_ROOT_070413\Slide5.JPG  A number of factors can degrade or prevent communication between your computer and your monitor or other external device. These include interference caused by electromagnetic devices or devices operating on radio frequencies, as well as cables that are too short, too long, or coiled too tightly. | Presentation notes |